

The opinion in support of the decision being entered today was *not* written for publication and is *not* binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

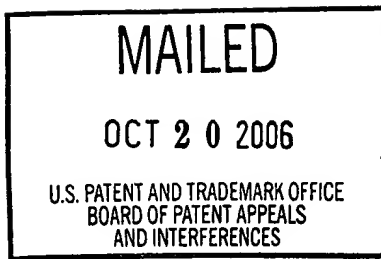
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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* CONRAD OLIVER GARDNER

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Appeal No. 2006-3173  
Application No. 08/896,514  
Technology Center 3700

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ON BRIEF

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Before OWENS, BAHR and HORNER, *Administrative Patent Judges*.  
BAHR, *Administrative Patent Judge*.

DECISION ON APPEAL

This is a decision on appeal from the examiner's final rejection of claims 55 and 59.

We AFFIRM.

## BACKGROUND

This is the second appeal to the Board in this application. In a decision in Appeal No. 2005-1094, mailed July 21, 2005, the rejection under 35 U.S.C. § 112, second paragraph, was affirmed as to claims 49 and 58 and reversed as to claims 46-48, 55, 57, 60 and 61; the anticipation rejection based on Ellers (US Pat. No. 4,923,025) was affirmed as to claims 34-36, 50, 54, 57, 60 and 61 and reversed as to claims 37, 58 and 59; the anticipation rejection based on Kenyon (US Pat. No. 4,438,342) was affirmed as to claims 46, 47, 51 and 61 and reversed as to claims 37, 40 and 55; the anticipation rejection based on Lynch (US Pat. No. 4,165,795) was affirmed as to claims 50, 51, 57 and 60 and reversed as to claims 37, 40, 54, 55, 58 and 59; the rejection of claim 41 under 35 U.S.C. § 103 was reversed; the rejections of claims 56 and 48 under 35 U.S.C. § 103 were affirmed; and a new rejection of claims 55 and 59 as being unpatentable over Lynch (US Pat. No. 4,165,795) in view of appellant's admissions in the present specification was entered pursuant to 37 CFR § 41.50(b). The appellant elected to reopen prosecution with respect to claims 55 and 59 subject to the new ground of rejection, pursuant to 37 CFR § 41.50(b)(1), submitting new evidence in the form of an affidavit by Philip C. Malte on August 23, 2005. The examiner made the rejection of claims 55 and 59 final and the appellant is appealing the final rejection.

The appellant's invention relates to a method of operating a hybrid vehicle having an electric motor and an internal combustion engine and a fast charge-discharge battery, wherein, in certain situations, power from the internal

combustion engine is rapidly captured to charge the fast charge-discharge battery and, in other situations, the fast charge-discharge battery powers the electric motor to contribute torque, and hence acceleration. Claims 55 and 59 on appeal read as follows:

55. A method of operating a hybrid vehicle having an electric motor and internal combustion engine power comprising:

- a. rapidly capturing power from a continuously running low horsepower internal combustion engine to charge a fast charge-discharge battery without loss of said power; and,
- b. providing instant powerful acceleration while in the cruise mode when the speed of the vehicle is dropping.

59. In combination in the method of operating a hybrid vehicle having an electric motor and an internal combustion engine:

- a. causing a fast charge-discharge battery to power the electric motor on throttle demand; and,
- b. transferring power output into electric power conserved in a fast charge-discharge battery when the internal combustion engine continues to run.

The examiner relies upon the following as evidence of unpatentability:

Lynch	US 4,165,795	Aug. 28, 1979
Admissions by appellant on page 7 of the present specification with respect to known fast charge-discharge batteries (hereinafter "AAPA").		

The following rejection is before us for review.

Claims 55 and 59 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Lynch in view of AAPA.

Rather than reiterate in their entirety the conflicting viewpoints advanced by the examiner and the appellant regarding this rejection, we make reference to the examiner's answer (mailed May 22, 2006) for the examiner's complete reasoning in support of the rejection and to the appellant's brief (filed March 8, 2006) and reply brief (filed June 6, 2006) for the appellant's arguments thereagainst.

#### OPINION

In reaching our decision in this appeal, we have given careful consideration to the appellant's specification and claims, to the applied Lynch patent and the admissions of appellant on page 7 of the specification, to the affidavit of Philip C. Malte (hereinafter "Malte affidavit") and appellant's declaration regarding pioneer status appended to the brief, and to the respective positions articulated by the appellant and the examiner. Having considered all of the evidence and argument before us, we conclude for the reasons that follow that the examiner's decision to reject claims 55 and 59 as being unpatentable over Lynch in view of AAPA should be affirmed.

Lynch discloses a hybrid vehicle having a drive system 10 including a motor-generator 12 and an internal combustion engine 20 connected to the same shaft 18. A transmission 22 and two fixed ratio gear boxes (19, 21) are also connected to the

shaft 18. The accelerator 24 and direction selector switch are connected to an electric servo valve on the transmission which acts to vary or reverse the direction of hydraulic fluid flow in the transmission to change the speed or direction of the vehicle in which the drive system 10 is placed (col. 4, ll. 53-58).

Lynch's vehicle uses a relatively small internal combustion engine which, when operated at a preferred speed, produces roughly the average power the vehicle will require in normal use (col. 2, ll. 45-48). The throttle of Lynch's engine 20 is constrained so that the engine runs at nearly constant power and a motor-generator is selected such that its no-load speed is the most efficient preferred operating speed of the engine (col. 6, ll. 46-51). As illustrated in Figure 2, at motor-generator, or shaft, speeds lower than the no-load speed, the motor-generator draws current from the batteries 14 and functions as a motor and, at speeds above the no-load speed, the motor-generator furnishes current to the batteries and functions as a generator.

In operation, Lynch's engine throttle is set for a power level that will cause the engine to run at about 2500 RPM (the no-load speed) under a normal or average load. At this speed, the motor-generator will neither supply torque to nor remove torque from the system. When external forces on the shaft 18, such as an upgrade or demand for acceleration from accelerator 24, cause the engine 20, and thus the shaft 18, to slow down below the no-load speed, the motor-generator likewise slows below its no-load speed and acts as a motor, drawing current from the batteries and supplying torque to the shaft. Conversely, when outside influences on the vehicle, such as the vehicle traveling downhill, cause an increase in engine RPM beyond the

no-load speed, the shaft will transmit this increased speed to the motor-generator 12, which will then act as a generator. When the motor-generator is acting as a generator, some of the torque from the shaft 18 is converted to electrical energy and stored in batteries 14. Thus, energy is not lost but stored for use at a later time (col. 8, ll. 35-67).

Lynch teaches that the batteries should be designed for short duration, high current discharge and have a low internal resistance and points out that this can be achieved by using standard automotive starting batteries with a large number of thin plates (col. 5, ll. 16-20). Lynch also indicates that, although the motor-generator may use almost any voltage, the use of two parallel sets of six 12-volt batteries (72 volts) is satisfactory (col. 5, ll. 13-16).

Claims 55 and 59 both call for the use of a fast charge-discharge battery. Consistent with appellant's disclosure (p. 7, ll. 8-11), we understand the terminology "fast charge-discharge battery" to be "a battery capable of faster charge than the current lead acid batteries." The examiner apparently recognizes that the "standard automotive starting batteries" alluded to by Lynch do not meet this definition. In order to overcome this deficiency, the examiner observes that batteries capable of faster charge than the current lead acid batteries were known in the art at the time of the appellant's invention, as admitted by the appellant on page 7 of the present specification, and determines that it would have been obvious to use such known fast charge-discharge batteries in Lynch's hybrid vehicle as storage batteries 14 to achieve the short duration, high current discharge and low internal

resistance objective of Lynch (answer, p. 4, citing col. 5, ll. 16-18). For the reasons that follow, we agree that the modification proposed by the examiner would have been obvious to one of ordinary skill in the art at the time of the appellant's invention.

A person of ordinary skill in the art of hybrid vehicles would have readily appreciated from Lynch's disclosure (col. 1, ll. 25-28; col. 5, ll. 2-3 and 16-18, in particular) the importance of using hybrid vehicle storage batteries that are capable of charging and discharging quickly in order to supply the necessary current to the motor-generator to provide extra torque to the drive train when demanded. We, like the appellant (brief, p. 9) recognize that Lynch indicates that "standard automotive starting batteries with a large number of thin plates" can be used for short duration, high current discharge (col. 5, ll. 16-20) within the context of Lynch's invention. Nevertheless, like our reviewing court, "[w]e start from the self-evident proposition that mankind, in particular, inventors, strive to improve that which already exists." *Dystar Textilfarben GMBH & Co. Deutschland KG v. C.H. Patrick Co.*, 2006 WL 2806466, at 8 (Fed. Cir. 2006) (quoting *Pro-Mold & Tool Co. Inc. v. Great Lakes Plastics, Inc.*, 75 F.3d 1568, 1573, 37 USPQ2d 1626, 1629-30 (Fed. Cir. 1996)). As stated in *Dystar*,

an implicit motivation to combine exists not only when a suggestion may be gleaned from the prior art as a whole, but when the "improvement" is technology-independent and the combination of references results in a product or process that is more desirable, for example because it is stronger, cheaper, cleaner, faster, lighter, smaller, more

durable, or more efficient. Because the desire to enhance commercial opportunities by improving a product or process is universal – and even common-sensical – we have held that there exists in these situations a motivation to combine prior art references even absent any hint of suggestion in the references themselves. In such situations, the proper question is whether the ordinary artisan possesses knowledge and skills rendering him capable of combining the prior art references.

*Dystar*, 2006 WL 2806466, at 8.

In this case, it is that desire to improve the performance of the hybrid vehicle by increasing the reaction speed of the storage batteries, and hence the reaction speed and readiness of the electrical system of the vehicle, that would have motivated one of ordinary skill in the art at the time of appellant's invention to replace the standard starting batteries of Lynch with batteries known in the art at that time to be capable of faster charge, such as nickel cadmium batteries, capacitor-battery storage devices or other fast charge-discharge batteries admitted by the appellant on page 7 of the present specification to have been known in the art at the time of the appellant's invention.

The appellant argues, citing the Malte affidavit appended to the brief, that the fact that fast charge-discharge batteries were known in the art at the time of the appellant's invention and were not only not used but actually avoided for the reasons (maintenance and operation issues, limited availability and toxicity) stated in the affidavit teaches away from their use in the Lynch hybrid vehicle (brief, p.

10). A reference may be said to teach away when a person of ordinary skill, upon examining the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant; in general, a reference will teach away if it suggests that the line of development flowing from the reference's disclosure is unlikely to be productive of the result sought by the applicant. *In re Gurley*, 27 F.3d 551, 553, 31 USPQ2d 1130, 1131 (Fed. Cir. 1994). We note, at the outset, that the maintenance/operation, availability and toxicity issues discussed in the Malte affidavit are directed to nickel cadmium batteries in particular. The Malte affidavit provides no indication that such issues pertain to other fast charge-discharge batteries admitted to have been known in the art at the time of appellant's invention. We additionally observe that toxicity is an issue with the standard lead acid automotive starter batteries alluded to by Lynch and that special precautions must be taken in their disposal. Accordingly, the toxicity issue raised in the Malte affidavit would not appear to be a very dissuasive factor in selection of storage batteries for a hybrid vehicle. As for the fact stated in the Malte affidavit that nickel-cadmium batteries of a size appropriate for automotive propulsion were available in the 1990's (the time of appellant's invention) from only one manufacturer, single-sourcing for automobile components, while perhaps less preferred by manufacturers, has by no means been completely avoided in the industry. Moreover, demand for manufactured goods tends to drive supply. Finally, as for the maintenance and operation issues raised in the Malte affidavit, while they highlight inconvenient attributes of nickel-cadmium

batteries that may require special design considerations in any application, we find nothing in this that would make them particularly unsuitable for a hybrid vehicle application.

For the reasons discussed above, we do not find that the maintenance/operation, availability and toxicity attributes of nickel-cadmium batteries addressed in the Malte affidavit would have discouraged one of ordinary skill in the art from using a nickel-cadmium battery or other known fast charge-discharge battery in the hybrid vehicle of Lynch. We do find that one of ordinary skill in the art of hybrid vehicles would have possessed the knowledge and skills to render him or her capable of substituting known fast charge-discharge batteries for the standard automotive starting batteries in the Lynch hybrid vehicle drive system. The motivation for their use in the Lynch hybrid vehicle, as discussed above, is the recognition in Lynch that the batteries should be designed for short duration, high current discharge and have a low internal resistance and the improved system performance achievable with the aid of their recognized fast charging and discharging characteristics.

With the substitution of fast charge-discharge batteries for the standard automotive starting batteries of Lynch, the modified Lynch hybrid vehicle fully responds to the limitations recited in appellant's claims 55 and 59. In particular, the step of rapidly capturing power from a continuously running low horsepower internal combustion engine to charge a fast charge-discharge battery without loss of said power recited in claim 55 occurs when the engine and shaft speed increase

above the motor-generator's no-load speed, for example, when Lynch's vehicle travels downhill, in which circumstance the motor-generator operates as a generator to charge the storage batteries. The step of providing instant powerful acceleration while in the cruise mode when the vehicle speed is dropping recited in claim 55 is met by Lynch when the shaft 18 is rotating at the motor-generator no-load speed and the engine speed suddenly drops, for example, on an upgrade, at which point the motor-generator begins to act as a motor and contributes torque to the shaft 18. As for claim 59, the step of causing a fast-charge discharge battery to power the electric motor on throttle demand occurs when Lynch's accelerator 24 is depressed to demand more torque, thereby decreasing the shaft speed to below the no-load speed and causing the motor-generator to act as a motor and contribute torque to the shaft to increase its speed to the no-load speed. The appellant (brief, p. 11) is correct that the panel in the decision in Appeal No. 2005-1094 (pp. 21-22) found that Lynch's hybrid vehicle relies solely on shaft speed to control the mode of the motor-generator and does not utilize pedal information to control the operation of the motor and engine. This fact, however, is not particularly relevant to claim 59, which, unlike claim 54 addressed in the portion of the prior decision alluded to by the appellant, does not require a logic control circuit responsive to both vehicle speed and accelerator pedal information. Rather, claim 59 merely requires the battery to power the electric motor on throttle demand. As explained above, this step is met by Lynch. The step of transferring power output into electric power conserved in a fast charge-discharge battery when the internal combustion engine

continues to run, recited in claim 59, is met by Lynch whenever the shaft 18 is caused to rotate at a speed above the no-load speed, for example, when the vehicle travels downhill, in which circumstance the motor-generator acts as a generator to charge the storage batteries.

The appellant has also submitted a declaration purporting to show that the appellant's invention has achieved pioneer status by virtue of the number of patents that have subsequently cited appellant's earlier patents and argues in the brief (p. 11) that the invention as defined by claims 55 and 59 has opened the door to subsequent inventions and satisfied a long felt need and failure of others. We first observe that the invention recited in claims 55 and 59 is not the invention recited in appellant's earlier patents. Even assuming that the citation of appellant's earlier patents evidences that the earlier patents are pioneer patents, that does not necessarily mean that the invention that appellant seeks to subsequently patent in the present application has also achieved such status. Moreover, the appellant has not cited any authority, and we are not aware of any such authority, that stands for the proposition that status as a pioneer invention has any bearing on patentability. *MAC Corp. of America v. Williams Patent Crusher & Pulverizer Co.*, 767 F.2d 882, 884, 226 USPQ 515, 517 (Fed. Cir. 1985) cited in appellant's declaration discusses the concept of "pioneer" invention only in the context that the patent at issue in that case was not a "pioneer" patent and thus not entitled to a broad range of equivalents (under the doctrine of equivalents). Indeed, the only discussion of "pioneer"

invention or “pioneer” patent that we find in the jurisprudence is in the context of the range of equivalents to which the claims of such a *patent* are entitled.

To the extent that appellant is arguing that the citation of appellant’s earlier patents in other patents evidences that the invention recited in claims 55 and 59 before us on appeal has satisfied a long felt and unsolved need of others, such argument is not well founded. An argument based upon long-felt need must be accompanied by evidence that demonstrates the existence of a problem which was of concern in the industry and has remained unsolved over a long period of time. *See Vandenberg v. Dairy Equip. Co.*, 740 F.2d 1560, 1567, 224 USPQ 195, 199 (Fed. Cir. 1984). This can be accomplished, for example, by the testimony of experts in the industry, or publications and the like, which speak to the duration and extent of the problem, and of the substantial effort and resources which had been expended during that time in attempts to solve the problem. *See Railroad Dynamics, Inc. v. Stuki Co.*, 579 F. Supp. 353, 363, 218 USPQ 618, 628 (E.D. Pa. 1983), *aff’d* 727 F.2d 1506, 220 USPQ 929 (Fed. Cir. 1984), *cert. denied* 105 U.S. 220 (1984). Once the long-felt need has been established, it must further be shown that the invention satisfied that need. *See In re Cavanagh*, 436 F.2d 491, 496, 168 USPQ 466, 471 (CCPA 1971). This can be demonstrated, for example, by evidence establishing commercial success and that the industry purchased the claimed invention because it satisfied the long-felt need. *See W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1555, 220 USPQ 303, 315 (Fed. Cir. 1983). Appellant’s declaration establishes nothing more than that appellant’s earlier

patents have been cited by other patents. It does not demonstrate the existence of a problem of concern in the automotive industry that remained unsolved over a long period of time or establish that the invention disclosed or claimed in appellant's earlier patents, much less the invention recited in claims 55 and 59 in the present application, in fact solved such problem.

Having carefully weighed all of the evidence before us in this appeal, we conclude that the subject matter of claims 55 and 59 would have been obvious to one of ordinary skill in the art at the time of the appellant's invention. Accordingly, the rejection of claims 55 and 59 as being unpatentable over Lynch in view of AAPA is sustained.

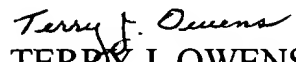
#### CONCLUSION


To summarize, the decision of the examiner to reject claims 55 and 59 as being unpatentable over Lynch in view of AAPA is affirmed. This decision is considered final for judicial review. As a consequence of this decision, the decision in Appeal No. 2005-1094 mailed July 21, 2005 affirming the rejection of claims 49 and 58 under 35 U.S.C. § 112, second paragraph, the anticipation rejection of claims 34-36, 50, 54, 57, 60 and 61 based on Ellers, the anticipation rejection of claims 46, 47, 51 and 61 based on Kenyon, the anticipation rejection of claims 50, 51, 57 and 60 based on Lynch, and the rejections of claims 56 and 48 under 35 U.S.C. § 103 is likewise now final for judicial review.

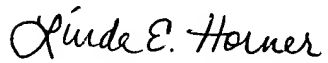
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Application No. 08/896,514

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a). *See* 37 CFR § 1.136(a)(1)(iv).

AFFIRMED

  
TERRY J. OWENS  
Administrative Patent Judge

  
JENNIFER D. BAHR  
Administrative Patent Judge

  
LINDA E. HORNER  
Administrative Patent Judge

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Conrad O. Gardner  
Box 1359  
Blaine, WA 98231

JDB/ki